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Central Intelligence Agency



Washington, D.C. 20505

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## DIRECTORATE OF INTELLIGENCE

March 1985

USSR: Short-Term Outlook for Oil ProductionSummary

Production of Soviet crude oil and condensate slipped to 12.23 million barrels per day (b/d) in 1984, down 100,000 b/d from the daily rate in 1983. The decline, though small thus far, reflects a host of problems associated with the advanced age of most of the USSR's largest oilfields and may signal a continuing downturn in production. Production is falling in the USSR's largest fields, which are at least 12-15 years old, and no new giant oil discoveries have been found or developed since 1973.

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The Soviet leadership recently implemented a series of personnel and administrative changes that reflect distress over the oil industry's problems. A large number of West Siberian production managers were fired, and oil minister Nikolay Mal'tsev was replaced by Vasiliy Dinkov. Vladimir Filanovskiy-Zenkov, chief of Gosplan's oil and gas section, will be Dinkov's new deputy. Administrative changes, however, are not likely to restore growth in oil output. With West Siberian oil production stagnant or possibly declining and output in other regions falling, a nationwide decline of about 200,000-300,000 b/d is possible this year.

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Last year, Moscow was apparently able to sustain exports by increasing reexports of OPEC oil, trimming domestic consumption, and drawing down domestic stocks. If larger production shortfalls materialize in 1985, the USSR may be unable to satisfy domestic oil requirements and maintain exports to Eastern Europe without avoiding some cutbacks in exports for hard currency. The Soviets have sold very little, if any, oil on the spot market since January, and Moscow suspended February shipments to many West European and Japanese customers.

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This memorandum was prepared by the Office of Soviet Analysis. It was written by [redacted] of the Soviet Economy Division. Comments and queries may be addressed to the Chief, Soviet Economy Division, [redacted].

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Background

During the 1950-80 period, Soviet oil production soared--from 750,000 b/d in 1950 to a record 12.33 million b/d in 1983 (see figure 1). Its ready availability prompted a massive conversion of Soviet industrial facilities from coal to oil.

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The rapid growth in output was made possible by annual increments of generally increasing size (figure 2). Since 1973, however, the oil ministry has failed to meet its annual production plans. After 1975, growth in output began to taper off noticeably until oil output reached 12.03 million b/d in 1980. Thereafter output inched up to the 12.33 million b/d posted in 1983.

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In 1983, according to information in the Soviet press, Tyumen' oil production increased by about 355,000 b/d, but 280,000 b/d were needed to offset capacity depletion in the older producing regions of the USSR. As a result, the net growth of total Soviet oil output in 1983 was only 75,000 b/d. At the end of 1983, the Soviet oil ministry noted that Tyumen' output had registered a 60,000 b/d shortfall.

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The first indications of a possible nationwide production decline were revealed in January 1984 press accounts of the Tyumen' Oblast plan for 1984.<sup>1</sup> The planned increase in Tyumen' oil production  was only 340,000 b/d--too small to cover expected declines in oil output

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<sup>1</sup> Output from Tyumen' Oblast accounts for about 97 percent of West Siberian production and 60 percent of nationwide output.

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elsewhere in the USSR much less to provide for any net growth in oil output nationwide. [redacted]

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In 1984, production in Tyumen' increased by only 140,000 b/d, about 200,000 b/d less than the planned increment. This increase was too small to prevent a drop of some 100,000 b/d in nationwide oil output. Reflecting the slowdown in growth of output in Tyumen', nationwide oil production reached what may have been its peak during the last quarter of 1982 and the first quarter of 1983, when an average daily rate of 12.41 million b/d was recorded. [redacted]

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#### Flagging Output Engages High-Level Policymakers

The slowdown in the growth of Tyumen' production and the region's below-plan performance over the last two years caused consternation in Moscow and has brought West Siberian operations under increasing high-level scrutiny. In late 1983, leading Gosplan, oil ministry, and CPSU officials mounted an onsite investigation. In April 1984 the depth of leadership concern was shown by the assignment--for the first time--of a deputy oil minister as chief of Tyumen' oil operations. Dissatisfaction with management of operations has continued, and--according to the Soviet press--the managers of nearly all of the production associations in Tyumen' Oblast were fired at the end of 1984. In January, the oil minister, Nikolay Mal'tsev, was replaced by the successful minister of the gas industry, Vasiliy Dinkov.

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Moreover, [redacted] Soviet media reports indicate that, in an unprecedented move to improve efficiency, two major organizations that control oil operations in the

European USSR have been given responsibility for three West Siberian production directorates. [redacted]

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The CPSU apparatus is also focussing on the objective of mobilizing Tyumen' workers to meet oil and gas production plans. A mid-February Tyumen' Party Obkom plenum was addressed by V.I. Dolgikh, candidate member of the Politburo and secretary of the CPSU Central Committee. He particularly stressed raising the standard of leadership of the oblast's oil industry and increasing the return on the resources devoted to oil production. Although the lower productivity and greater remoteness of new oil deposits have been factors in the failure to meet production plans, the basic problem is one of poor management, according to Dolgikh. Oil officials failed to foresee the growing requirements for artificial lift and to provide adequate maintenance and logistical services. He attributed part of this failure to laxity on the part of local party units and called upon party members to coordinate their activities more effectively. [redacted]

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#### Problems at Samotlor and Federovo

The most serious technical problems affecting Tyumen' oil production are occurring in the two largest Tyumen' producing associations. These organizations manage two of the largest oilfields in the USSR, Samotlor and Federovo, which produced 45 percent of Tyumen's oil last year. Difficulties associated with water injection systems and the sharply rising water content of fluid recovered from producing wells in the older oilfields are accumulating. Severe corrosion problems, for example, now affect

Samotlor's pressure maintenance and oil gathering systems. Oil flow lines only seven years old have averaged 3 to 4 leaks per kilometer, allowing oil and water to form numerous pools, which pose a fire hazard. Corrosion has also so weakened Samotlor's water-supply lines for the waterflood pressure-maintenance system that full injection pressures cannot be applied. In 1983, a reduction in the volume of water injected allowed reservoir pressures to fall to low levels in several areas of the field

[redacted] idling a number of wells.

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Samotlor's average water-cut (the percentage of water in the fluid produced from oil wells) tripled from 1978 to 1984, and

[redacted] it now is above 50 percent.

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The increase in water production was most pronounced in late 1983 and in 1984. Fedorovo also produces more water than oil. The net effect of all of these problems on total oil production for the region was suggested in the December production figures.

Tyumen' ouput was 200,000 b/d less than that reported for September. Normally, the Soviets produce all they can in the last month of the year to win awards and bonuses. [redacted]

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The Samotlor and Fedorovo fields are now being converted to gas-lift operation. Introduction of this system of artificial lift (an alternative to the use of pumps) when the water cut is above 50 percent may no longer yield the benefits and results expected. Experience gained at another West Siberian field shows that the efficiency of a gas-lift system drops noticeably after water accounts for more than 40 percent of total fluid produced. [redacted]

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Bright expectations for the newly developed area north of Fedorovo apparently collapsed in mid-1983 without warning.

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Soviet press articles [redacted] have cited serious production shortfalls and reported that some newly drilled wells would not flow. Many wells at the Sutorminsk field have been switched over to pumps far in advance of the time envisaged in the original development plan. Reservoir porosities, permeabilities, and pressures apparently are unable to support the planned well-flow rates and production plans. If reservoir characteristics in other new oil deposits to the north of Surgut and Fedorovo resemble those of Sutorminsk, oil extraction from the area may require more wells, equipment, manpower, and time than has been anticipated by Soviet planners. [redacted]

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#### What Went Wrong

The shortfalls in West Siberian production can be traced in part to reserve quality that has not met official expectations. Production has also been affected adversely by the failure of Soviet industry to supply pumps and other oilfield equipment in adequate quantity and quality. As a consequence of these factors, Soviet planners and oil industry leaders have been caught short in the race to keep up with rising investment and manpower requirements. [redacted]

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#### Lower Well Flows

Last April a Pravda article said that times had changed. Wells had stopped flowing naturally, and it was now necessary to "extract" the oil in the literal sense. To do this however, one had to have special equipment, which was not being supplied to

the producing associations in adequate quantity and quality. [ ] 25X1

R.I. Kuzovatkin, who was put in charge of Tyumen' oil in early 1984, placed some of the blame at the door of the Ministry of Geology. He implied that many of the Soviet geologists' initial reserve estimates for the Tyumen' oilfields were exaggerated and that estimated recovery rates were too high. Production targets based on these estimates were, therefore, unrealistic. [ ]

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According to a geologist and member of the Academy of Sciences, reserve estimates made during 1971-83 failed to spell out the time and identify the technology needed to recover 45 to 50 percent of the oil-in-place, the common Soviet recovery factor.<sup>2</sup> According to several Soviet studies of pre-1983 Soviet reserve criteria, it often takes as long as 40 to 50 years to realize the high recovery rates originally envisioned. [ ]

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[ ] Soviet press articles have supported recent questions about the producibility of reserves in new oil deposits now under development. There have been many reports of newly drilled wells that would not flow, clearly indicating a quality deterioration in the Tyumen' oil fields now being drilled. [ ]

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<sup>2</sup> Recovery rates of 45-50 percent are unrealistically high by Western standards. Western reserve estimates for a new pool or reservoir usually indicate the amount of oil-in-place at the time of discovery and the percentage of the oil that is expected to be recovered during a 15-20 year period under prevailing economic conditions with existing technology and equipment. The average US recovery rate for over half a million oil pools for many decades has been 33 percent. [ ]

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When Soviet oil-industry planners and managers use overstated estimates of potential well-flow rates as a basis for ordering equipment and planning manpower allocations, it is inevitable that production shortfalls will occur. The effect of planning error is then exacerbated by frequent failures in equipment, electricity supply, and logistical support. [redacted]

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Rising Requirements for Investment and Manpower

Since 1980, high-ranking Gosplan officials have pointed to the alarming decline in average new-well flows--from 1,183 b/d in 1975, to 518 b/d in 1980, and down to an estimated 277 b/d in 1981-85. According to Gosplan, an additional 1 billion rubles of investment was required in 1980 to offset a reduction of 7.3 b/d in the average flow rate. In late 1982, Oil Minister Mal'tsev described the problem by pointing out that a 20,000 b/d increment in oil production (allowing for normal depletion rates) required the drilling of 265,000 meters of wells in 1970 and 866,000 meters in 1980, but would require 7 million meters of wells to be drilled in 1985. An Izvestiya editorial subsequently noted that "if drilling volumes are to double every five years just to maintain present high levels of oil and gas output as now planned, then we will need over 2,500 extra rigs, 250,000 tons of drill pipe, and 250,000 more workers--including 70,000 drillers which are in extremely short supply." [redacted]

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A more fundamental factor underlying many of these problems is the increasing age of the USSR's oilfields. Giant fields always play a vital role in maintaining steady growth in total output even though, after a decade or so of exploitation, their

production inevitably declines. The dozen largest fields in West Siberia are now 12 to 15 years old. As the fields age, reservoir pressures decline, reservoir permeability tends to decrease, and water production increases markedly. The use of artificial lift increases rapidly, and pumps break down more frequently because of corrosion and the buildup of salts in the well bore. As a result, well-maintenance requirements escalate. Last year, a shortage of 100 workover crews was reported in Tyumen', even though 250 crews were already assigned. In the much milder Baku climate, one of these crews looks after 29 wells; in the more hostile Tyumen' environment each crew is expected to maintain 55 to 85 wells scattered over difficult terrain.

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Production planning in this environment is fraught with risk and uncertainty. It appears, however, that Soviet oil planners have repeatedly missed windows of opportunity for timely and efficient acquisition and utilization of equipment (particularly with respect to artificial lift) and for implementation of measures to inhibit and otherwise deal with corrosion. A glaring example of inept planning was reported by Izvestiya last April. In 1980, the Tyumen oil administration submitted a 1981-85 production goal of 6.8 million b/d for 1985 that was the basis for equipment orders and investment plans. Moscow raised the goal to 7.5-7.6 million b/d without allocating additional investment, equipment, and manpower.

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### Outlook

We believe that Soviet oil output in 1985 will be well below the planned 12.56 million b/d and is unlikely to match the 12.23

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million b/d posted in 1984. This conclusion is based on the early 1985 production record, as well as voluminous evidence from [redacted] the Soviet media that lower new-well flows, equipment shortages, corrosion, and inadequate supply of skilled manpower continue to hamper efforts to sustain oil production. [redacted]

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Oil production in January--11.92 million b/d--was below plan and 300,000 b/d below the 1984 average daily production level. With oil output from the key West Siberian region showing signs of slower growth--and possibly flattening out or declining--and production from the other producing regions declining by about 250,000 b/d per year, a nationwide decline of about 200,000-300,000 b/d is possible this year. Efforts to check the decline will be progressively more costly in terms of manpower and investment resources. We believe that a turnaround is unlikely this year. In the longer run, the USSR will have to make some adjustments in its Energy Program. It will have to decide whether the situation in West Siberia makes it possible to continue to plan on rising oil and gas condensate production through the end of the century without diverting an unacceptably large share of national investment to the oil sector. [redacted]

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Last year, Moscow was apparently able to sustain exports by increasing reexports of OPEC oil, trimming domestic consumption, and drawing down domestic stocks. If larger production shortfalls materialize in 1985, the USSR may be unable to satisfy domestic oil requirements and maintain net exports to Eastern Europe without avoiding some cutbacks in exports for hard

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